

## ABSTRACT

Unique ultrapure water produced by reverse osmosis  
5 equipment. The high purity or ultrapure water is  
characterized by extremely low levels of Total Organic  
Carbon that are achieved after a single pass reverse  
osmosis process step. The feedwater to the reverse  
osmosis process is preferably pretreated to remove  
10 hardness and non-hydroxide alkalinity by simultaneous  
removal in a weak acid cation exchange resin. The  
process includes ionization of sparingly ionizable  
components, such as silica, by adjusting the pH up to  
about 10.5 or higher. The passage of boron, silica, and  
15 TOC is therefore significantly reduced. Consequently,  
the high purity water is produced with high recovery  
rates from the entering feedwater. Therefore, a unique  
ultrapure water product is provided that significantly  
reduces costs for post-treatment in downstream polishing  
20 steps.